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REPORT OF THE 1931 SURVEY OF THE CODY CANYON BARKBEETLE CONTROL PROJECT, WITH RECOMMENDATIONS FOR CONTROL

(Shoshone Nat'l. For.)

by
James C. Evenden
Entomologist

Forest Insect Field Station,
Coeur d'Alene, Idaho,
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REPORT OF THE 1931 SURVEY OF THE CODY CANYON BARKBEETLE CONTROL PROJECT, WITH RECOMMENDATIONS FOR CONTROL

INTRODUCTION

The Cody Canyon barkbeetle control project of the Shoshone National Forest, directed against an outbreak of the Douglas fir beetle (Dendroctonus pseudotsugae) in forests which had been severely defoliated by the spruce budworm (Cacoecia fumiferana), was instituted in the fall of 1931. During this project, 12,038 trees were treated at a cost of $11,937, which includes contributed labor to the amount of $2,789. This project had as its objective the preservation of the scenic values of the roadsides, summer homes, dude ranches and resorts, as well as the commercial value of the timber at stake.

To determine the results secured from the 1931 control operation, a survey of the infested area was conducted during the latter part of July and early August. The writer was assisted in this survey by Messrs. Terrell and Miller, of the Bureau of Entomology, and Mr. C. C. Spencer, Forest Ranger, Wapiti, Wyo. Though only nine field days were spent in the actual survey of the infested areas, Mr. Miller had previously spent practically the entire month of July in making an extensive reconnaissance of the general region, searching for infested areas not previously located. The purpose of this report is to present the entomological situation as existed in the fall of 1931, the results of the 1932 survey depicting the present situation, with the writer's recommendation relative to future activity in connection with this project.

THE 1931 SITUATION

In 1922, an outbreak of the spruce budworm was reported from the Cody Canyon, Shoshone National Forest. During the years following this report, the outbreak spread over a tremendous acreage, causing the destruction of large areas of Douglas fir in many of the small drainages. Following the severe 1929 defoliation, which threatened the destruction of valuable scenic timber stands around dude ranches, resorts and summer homes, Congress appropriated $10,000 to the Bureau of Entomology for an experimental spraying of these forests. In 1930, the trees around the homes and along the roadside, etc. which were within the infested area were treated with what was assumed to be the most effective spray known to the Bureau of Entomology. The results of this work were very discouraging, as the insect proved to be a very difficult pest to control through the use of sprays. In the fall of 1930, it looked as though a natural decline in the budworm epidemic had occurred; however, in 1931, the spraying was repeated on a smaller, but greater experimental basis. Following the 1931 defoliation, it was very evident that due to natural causes a very marked reduction in the severity of the defoliation had occurred, and it was assumed that the outbreak of this insect was at an end. However, in all of the drainages where the timber had been severely defoliated for a number of years, there were areas, varying from a few acres to as many as a hundred or more, where the Douglas fir stands appeared as dead trees, as many of them were.

Records show that, following defoliating epidemics of this nature, barkbeetles peculiar to the tree species defoliated attack the weakened

trees, and in many cases are responsible for the final injury causing death. Though it was known that the Douglas fir beetle was working in the weakened and dying Douglas fir trees within the defoliated area, it was not until the 1931 season that the magnitude of the barkbeetle infestation was realized, or that the beetles had started to spread to the less seriously injured timber around some of the dude ranches and summer homes.

In considering the magnitude of the barkbeetle infestation, which later proved to be even more serious than previously anticipated, with the extremely heavy broods which existed in the weakened trees, it was apparent that if this outbreak was allowed to develop to its maximum the trees of scenic value to the resorts, homes, etc. which had been spared by the budworm would be subsequently destroyed by barkbeetles. This was especially true, as at that time it was believed that the budworm outbreak was at an end and that there would be no further accumulation of susceptible, weakened host material as a result of defoliation. With this objective, it was recommended that as far as practicable all infested trees within the area be treated, and the sum of $10,000 was allotted for this purpose.

THE 1932 SURVEY

This survey was conducted by running sample strips two chains wide through the infested areas with a three-man crew. These strips were projected on a fairly accurate compass bearing, and carefully selected so that as fair a sample as possible might be secured. The distances covered were paced in order that the actual acreage covered might be secured. The 1932 attacked trees were recorded, reduced to an acreage basis, and applied to

the total acreage of the area surveyed.

This region proved to be a difficult one to survey, for not only is the terrain of an exceedingly rough character but the timber stands lie in small bodies separated by high, rocky ridges. Furthermore, the area is unsurveyed, and the determination of the total acreage for each unit was a rather uncertain procedure. To check the accuracy of the sample strips as located, the stumps from the 1931 treated trees were recorded in addition to the newly attacked trees. These data applied to the entire acreage surveyed showed some 13,800 trees as against some 12,000 actually treated. Though this difference of 13% is as close as one could expect with an extensive survey of this character, it is believed that it can be partially explained by the fact that a much larger acreage was considered for each unit than actually covered by control in 1931, and which was not compensated for by an equal amount of strip. However, it would seem that the strips as located gave a very fair sample of the area.

A tabulated summary of the results of the survey follows:

TABLE SHOWING DATA SECURED BY SURVEY

No.	Name	Acres	Trees Treated 1932	Acres Covered by Survey	New Attacks per Acre	Total New Attacks	Per cent of Increase or Decrease	Remarks
1	Bloom Gulch	144	878	31.2	1.44	207	-76.4	
2	Moss Cr	272	733	26	.69	187	-74.5	
3	Cedar Gulch	20	122	6	1.83	36	-70.0	
4	Libby Cr	168	46	20	.76	127	+176.0	
5	Fishhawk Cr	786	275	104.2	.95	746	+171.2	
6	Chimney Flat		198			125?	-36.8	Unsurveyed - Estimate only
7	Mesa Cr	171	315	27	2.96	506	-60.6	
8	Sheep Cr	190	407	24.6	1.62	307	-24.5	
9	Blackwater Cr	1,052	4,833	121.4	2.13	2,240	-53.7	
10	June Cr	852	2,271	79.8	.83	707	-68.8	
11	Beetle Gulch	398	1,796	54.4	1.60	597	-66.7	
12	Lower Gulch		164			100?	-39.0	Unsurveyed - Estimate only
13	Mormon Cr	204	---	28.2	.07	14	---	
		4,257	12,038	522.8		5,899		

Per cent of Area Covered by Survey 12%
Reduction of Infestation 52.6

One's first reaction to the data as shown is that a reduction of 52.6 per cent is not as great as should be. However, there are two factors which should be carefully considered before such a decision is made. These are the difficulties encountered by the spotters during the 1931 project, and the fact that had no control been instituted there would have undoubtedly been at least 40,000 trees infested at this time instead of only 5,694. The fact that last fall there were many trees containing exceedingly heavy broods of beetles which appeared to have been dead for a number of years, made the location of infested trees a difficult task. There was no discolored foliage to guide the spotters to infested trees, and it was necessary to actually examine practically every tree in the area to be sure if it harbored insects. Though a very excellent job of spotting was done, it would be foolish to assume that trees, even as many as 10%, were not missed. With the barkbeetle broods as heavy as existed in the 1931-attacked trees, one can be assured that it would not take many trees to produce the estimated number of 1932 attacks. The writer has often mentioned the difficultires of measuring the results secured from insect control, but it is evident that unless one considers the potentials of the 1932 infestation had no control been instituted, the work is surely placed on an unsound basis. Therefore, it would seem that the results secured from the 1931 control operation, though of course not as great as one would like to have, are satisfactory to the extent that under existing conditions a great deal more could not have been expected. Many of the 1932-infested trees are but lightly attacked around the base, and it is believed that as a general rule the broods of the present infestation will be much lighter than encountered in 1931.

THE 1932 SITUATION

Under the same conditions as existed in the fall of 1931, there would seem to be no other course to pursue than to again treat the existing attacked trees in the fall of 1932. However, the prophecy made in regard to the future of the budworm epidemic, which can be considered as providing favorable host material for the beetles, seems to have been in error. The defoliation of the past season was far more severe than in 1931, and as there were countless numbers of the adult moths observed in oviposition, one can be assured of a severe 1933 defoliation. At the present time, there are no methods which can be recommended for such budworm outbreaks as now exist in the area. How much longer this epidemic will continue one can not say. If defoliation is repeated for a number of years, the trees for which protection is desired will be destroyed without the aid of the beetles. If only for another season or so, the trees will be spared from budworm destruction, but if the beetles are allowed to develop into the severe epidemic which threatened in the fall of 1931, there is little question but that large numbers of trees will be destroyed by this agency. On one hand there is the question as to the life of the budworm epidemic, with the knowledge that several years defoliation will destroy the trees. On the other, there is the rather positive assurance that, regardless of the future of the budworm outbreak, the beetles, if allowed to continue unchecked, will destroy timber stands of high scenic values. The institution of barkbeetle control in 1932 would need be on the basis of hoping that the budworm epidemic will soon die down, and not of itself destroy the trees preserved through the control of the beetles. As long as the budworms continue to

provide volumes of timber weakened through defoliation, there will continue to be barkbeetles within the area. Barkbeetle control must be projected on the basis of reducing the present outbreak to as near a normal condition as possible, which must be maintained until the weakened host material has been eliminated. Under conditions assumed to exist in 1931, it is believed that another year or perhaps two of beetle control would have reached this objective. With the apparent revival of the budworm epidemic, one can not foresee the extent or life of the favorable host material which will be provided.

RECOMMENDATIONS

The complexing association of two destructive insect outbreaks, one of which is at this time uncontrollable, and which feeds the other through providing favorable host material, has made an analysis of this problem a somewhat difficult task. If the budworm outbreak continues for a number of years, large areas of timber will be destroyed from defoliation alone. On the other hand, if the outbreak be near an end, many trees of scenic value would be spared if they could be protected from the attacks of beetles. What the life of the budworm epidemic will be is, of course, unknown; however, based on similar outbreaks that have occurred in the Northwest during the past ten years, its end is now overdue.

Any recommendation for the institution of further control measures against the Douglas fir beetle must be based upon the gamble that the budworm epidemic will not continue to an extent of destroying the benefits accrued from beetle control. In justifying such a "safety-first" position, there are certain factors which must be considered. At this time such

projects must be considered as initial steps in the development of the technique of barkbeetle control, so in addition to the economic returns hoped for, there is the experimental data, the value of which remains the same regardless of the results secured. There is also the investment which has already been made in the project, and the satisfactory returns already secured, which should be protected through additional expenditures. On the other hand, there is the extent to which public funds can be expended for the protection of timber stands, valued mostly for their scenic properties, which though publicly owned are of primary value to individual private interest. Furthermore, the timber stands for which protection is desired are for the most part mature, and each decade they are protected from insects and disease makes the task a more difficult one, until at some future time the inevitable will happen and destruction occur.

Following last season's control operation, temporary protection from the 1932 attacks of the beetles was given to the timber stands around the resorts, homes, etc. Due to the fact that fortunately the beetles are mostly in areas somewhat remote from the timber stands of greater value, it is believed that the danger from the present outbreak of the beetles can be averted through further control, if no additional damage of a serious nature results from the budworm epidemic. Another fortunate fact is that in the areas for which protection is especially desired the budworm defoliation has not been so severe as in the regions where the beetles are now working. In these severely injured areas, there are still large quantities of weakened host material, with the prospects of more being created, which should hold the beetles for some time.

After carefully considering all of the many factors involved, it seems that control measures should again be instituted in the fall of 1932. There are two plans of control which could be adopted for this project during the coming fall, the selection of which will depend primarily upon the funds available. Obviously, the soundest entomological procedure would be to re-cover the same areas as treated in the fall of 1931, locating and treating all infested trees possible. Such a plan would result in a reduction of the present barkbeetle infestation to a still lower level, and further reduce the chances of the insects spreading into the more valuable timber stands. Such an operation, based on the costs of the 1931 project, would require some $6,000, and would undoubtedly be the best policy to follow if funds are available.

The second plan would call for the treatment of all infested trees within a mile of all resorts, homes, camp sites, etc., which is believed would afford protection to these areas from the 1933 attacks of the beetles. This plan should only be adopted for the purpose of holding for another season, with a minimum expenditure, the ground already gained, so that more information will be available as to the future of the budworm outbreak. The weakness of such a plan is that the infestation in the remote, untreated areas would be permitted to increase to such a point that at least four times as large an appropriation would be required to treat the trees in 1933 than in 1932. Though the survey data were not secured with this plan in mind, they have been allocated to these restricted areas and show that there are 2,300 trees which would need be treated under this plan of operation. At least $3,000 should be allotted to this project, which should not be adopted except under urgent restriction of funds.

Therefore, in view of the investments already made, the value of the property at stake, and the experimental value to be secured from this project which will serve as a guide for action in future outbreaks, it is recommended that the sum of $6,000 be allotted for a clean-up of all the areas worked during the 1931 season, as well as any additional areas which may later be discovered, which may be considered as being a part of this project.

Respectfully submitted

James C. Evenden

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Entomologist

NORTH FORK SHOSHONE RIVER

Libby Cr.

Holm Lodge

Goff Creek

Gunbarrel Creek

Newton Creek

Moss Creek

Aspen Creek

Kitty Creek

Sheep Cr.

Blackwater Creek

June Cr.

1 2 3 4 5 6 7 8 9 10 11 12

LEGEND

Units

1	Bloom Gulch	7	Mesa Creek
2	Moss Creek	8	Sheep Creek
3	Cedar Gulch	9	Blackwater Creek
4	Libby Creek	10	June Creek
5	Fishhawk Creek	11	Beetle Creek
6	Chimney Flat	12	Lower Gulch

Boundary of units

1932 survey strips

Scale 1½" = 1 Mile.

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